

# COVID and IR

Daniel Sheeran, M.D.

Assistant Professor, Interventional Radiology



# Disclosures:

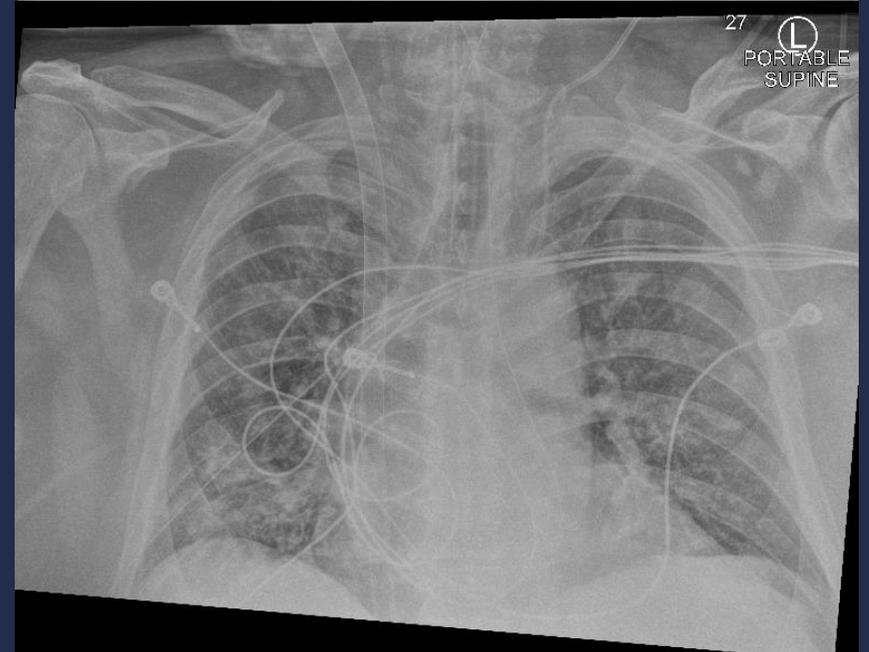
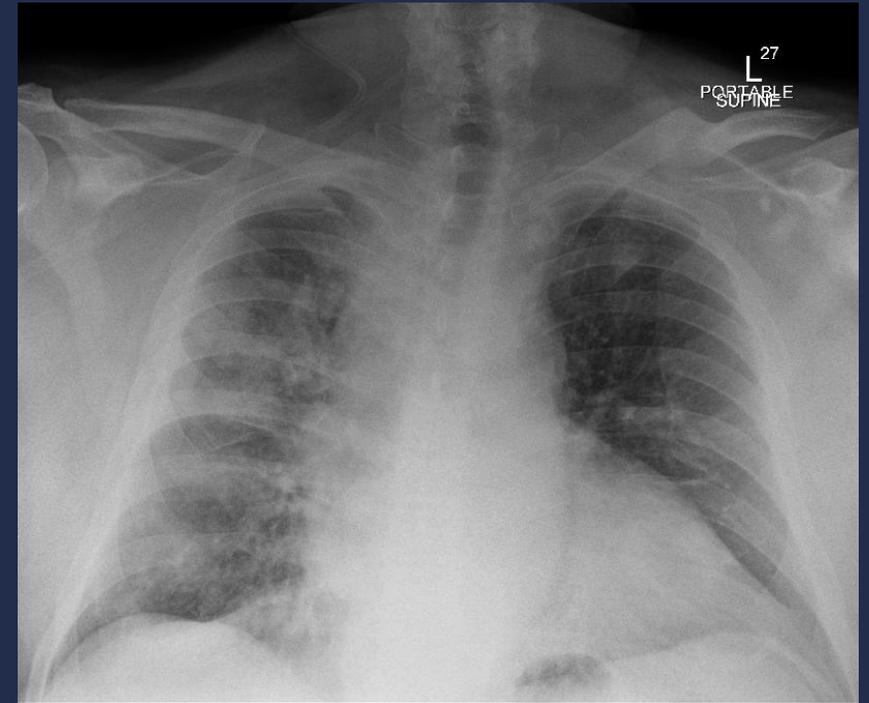
None.

# Outline:

- COVID and evolution over time
- COVID and effects on a clinical IR practice
- COVID and IR clinical manifestations

# COVID Evolution:

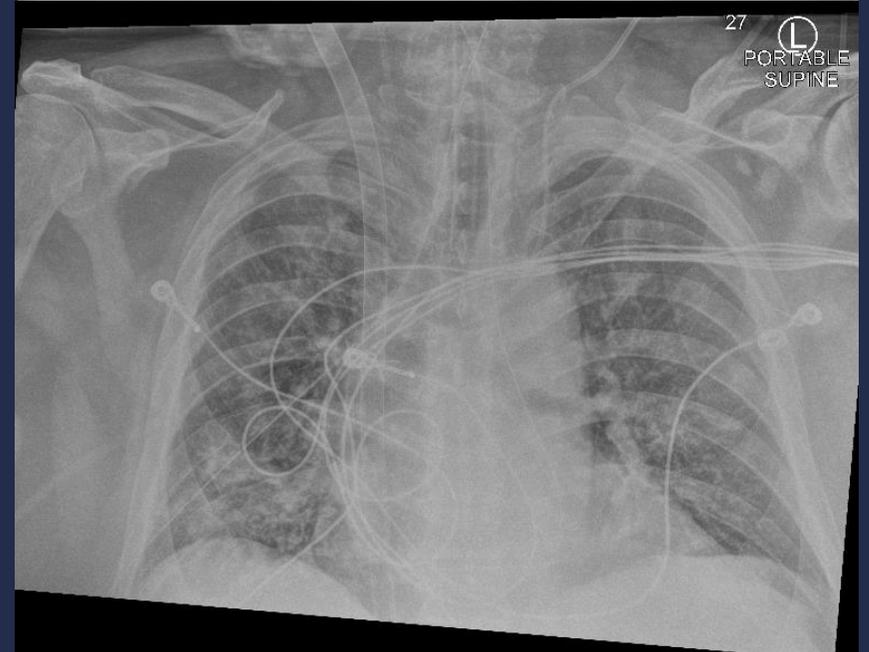
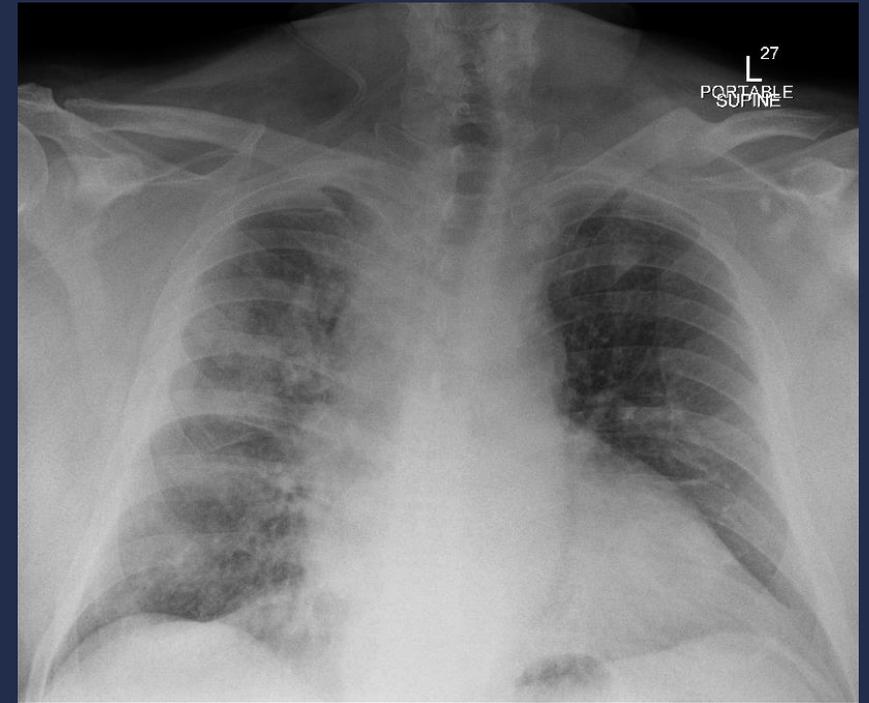
- Similar to everyone – frontline workers and rest of population
- Components of fear – different from pre-existing pathogens
- Rapidly changing environment in the IR suite, the hospital, local, and regional levels
- COVID Fatigue



th

# COVID Evolution:

- Stages of grief – DABDA?
  - Denial – likely won't come to our hospital
  - Anger – why is it here?
  - Bargaining – At least I don't do intubations
  - Acceptance – I am probably getting COVID.



# COVID and IR Effects:

- How do you accommodate COVID patients?
- Location
- Manpower
- Inventory



# COVID and IR Effects:

- How do you accommodate COVID patients?
- Location
- Manpower
- Inventory

The Society of Interventional Radiology (SIR) recommends the following:

- **Cancel all procedures except for those that are urgent or emergent.** As the practice of IR is broad, specific nuances should be considered during the medical decision-making process including the health status of the patient, medical acuity and expected outcome, and local logistics pertaining to resource allocation. While some practices in endemic areas may already be working in an emergency triage model, we urge all IR physicians to begin the triaging process by engaging with their hospital administrations and colleagues within other medical specialties to classify procedures into those that are urgent/emergent vs. elective in a manner that best supports their practice situations and community needs. Cancellation and deferment of elective cases ensure that we contribute to maximizing hospital resources for the sickest patients. Communicate often to review measures as this is a dynamic situation.
- **Minimize the use of essential items that will be needed to care for patients in the event of a surge of cases.** This includes, but is not limited to, ICU beds, PPE, ventilators. Limiting the number of individuals caring for patients (essential personnel only) now minimizes current PPE utilization, allowing for conservation and sufficient supply when needed. Many locations have experienced PPE shortages, so securing PPE materials now will preserve them for future use for our frontline staff.
- **Screen all patients for high-risk exposure<sup>v</sup> or symptoms** according to the CDC guidelines ([updated March 24<sup>vi</sup>](#)), which includes the recommendation to follow local guidance for testing where the occurrence of community transmission of COVID-19 infections is high (CDC Priority 1 testing). **If local guidance requires testing prior to surgical procedures, this same standard should apply to procedures performed in the IR suite.**
- **Optimize-staffing and consider cohorting teams to facilitate social distancing and limit risk of community spread.** Minimize the number of personnel in all treatment rooms and control areas, especially when such places make it difficult for medical teams to stay 6 feet apart from each other.
- **Utilize telehealth services for IR clinic and follow-up visits when appropriate to limit exposure.** Please see the CMS Medicare Telemedicine Health Care Provider Fact Sheet<sup>vii</sup> for additional information.

# COVID and IR Effects:

- Safety of patients and health care providers
- Endless protocols
  - Protooled safety
  - Too detailed?
  - Ephemeral

COVID-19 IR Workflow Checklist for ICU/Acute Care Patient <b>2</b>	Phase of Care: Room Prep	Phase of Care: Pre-flight Checklist	Phase of Care: Intra-Procedure	Phase of Care: Post Procedure
<p><b>Coming to Room 17 For Procedure</b></p> <p><b>Phase of Care: Consult</b></p> <p><b>1844:</b></p> <ul style="list-style-type: none"> <li>Assess appropriateness of procedure by phone and EPIC/PACIS review</li> <li>Complete COVID consult checklist</li> <li>Discuss with Primary of the Day or designee</li> <li>Determine if bedside (see bedside protocol) or room 17</li> <li>Inform lead TECH for day</li> <li>Inform charge RN for day</li> <li>Complete H&amp;P</li> <li>Determine if capacity form is needed</li> <li>Verbal consent from patient or POA</li> <li>Place request</li> <li>Place orders for labs, T&amp;S, or other pre-procedure</li> <li>Consent to anesthesia if needed</li> <li>Ensure there is a conversation with requesting team regarding procedure</li> </ul> <p><b>Attending of the Day or Designated attending:</b></p> <ul style="list-style-type: none"> <li>Discuss recommendations with referring attending</li> <li>Discuss with anesthesia board runner if needed</li> <li>Co-sign H&amp;P/pre-procedure note</li> <li>Determine primary operator                             <ul style="list-style-type: none"> <li>Attending, Fellow or PA</li> <li>Attending [scrub/not scrub]</li> </ul> </li> <li>Determine if assistant technologist needed to scrub [Y/N]</li> <li>Inform lead TECH who will be scrubbing in</li> </ul> <p><b>COVID Lead Tech:</b></p> <ul style="list-style-type: none"> <li>Ensure charge nurse or call RN know of case</li> <li>Ensure room 17 is clean and plastic in place</li> <li>Order PAPP if needed</li> <li>Designate in room tech _____</li> <li>Designate control room tech _____</li> <li>Insure basic angio inventory cart ready to go to 17</li> <li>Make list of specific inventory to be pulled with attending</li> <li>Ask control room tech to pull procedure specific inventory</li> <li>Talk to anesthesia tech as necessary</li> </ul> <p><b>COVID Lead RN:</b></p> <ul style="list-style-type: none"> <li>Inform RADHU of COVID patient at 2-3302 and give approximate time</li> <li>Inform unit RN a procedure is going to happen in room 17</li> <li>Discuss pathway with unit RN (west elevator to CT hallway)</li> <li>Discuss with unit nurse or acute care that they will provide someone for cleaning surfaces touched during transfer to IR</li> <li>Discuss sedation/anesthesia plan with unit RN</li> </ul>	<p><b>Phase of Care: Room Prep</b></p> <p><b>CR tech:</b></p> <ul style="list-style-type: none"> <li>Control room tech to place basic angio and necessary specific inventory in 17</li> <li>Hold additional basic and specific supplies in control room or embu cart in hallway</li> <li>Have available all necessary phone numbers in CR</li> </ul> <p><b>In room physician or PA:</b></p> <ul style="list-style-type: none"> <li>Discuss in room 17 with in room tech the access site and location of table, US and monitors</li> <li>Have clean scrubs ready</li> <li>Review again who will be scrubbed in (all or none for these procedures)</li> <li>Review your pre-flight checklist</li> </ul> <p><b>COVID Lead RN:</b></p> <ul style="list-style-type: none"> <li>Roll PPE cart to 17</li> <li>Confirm with grab and go list and cart supply list</li> <li>Ensure code cart is stocked and defibrillator works (RADHU checks these each day)</li> <li>Confirm all supplies and equipment needed is in room 17 to include two large redlined trashcans</li> <li>Ensure the red liners in the trashcans are pressed up against the sides of the container</li> <li>Ensure consent and note are completed</li> </ul> <p><b>In room RN:</b></p> <ul style="list-style-type: none"> <li>Bring patient O2 supplies to 17</li> <li>Ensure suction supplies already in room 17</li> <li>Ensure pink cart is stocked</li> <li>Transfer pink cart to control room for 17</li> <li>Ensure Pyxis is accessible</li> <li>Review and prepare for "Pre-Flight Checklist"</li> <li>Have clean scrubs ready</li> <li>Call ICU/acute care nurse accompanying patient to discuss                             <ul style="list-style-type: none"> <li>medication including sedation</li> <li>How many lead aprons and what sizes</li> <li>Remind them that you need a donning coach and that they need to use the IR donning checklist in prep for coming to IR (take checklist with you)</li> <li>Tube consent to 811 or make copy of consent/tube to 811 then place in red lined trash for disposal after procedure</li> <li>Bringing hover mat pump if pt on hover mat</li> </ul> </li> <li>Things to take with you                             <ul style="list-style-type: none"> <li>Your lead</li> <li>Your PPE to include face mask/shield, blue isolation gowns to fit over the lead</li> <li>hats</li> <li>elevator key unless it was discussed that they will use theirs</li> </ul> </li> </ul> <p><b>BUc RN:</b></p> <ul style="list-style-type: none"> <li>assist "lead" RN and tech with in-room preparation</li> </ul> <p><b>In room tech:</b></p> <ul style="list-style-type: none"> <li>Review needed inventory as discussed with primary operator in room</li> </ul>	<p><b>Phase of Care: Pre-flight Checklist</b></p> <p><b>Procedure team Huddle prior to calling for patient:</b></p> <ul style="list-style-type: none"> <li>In room people have their lead, but are not in PPE yet</li> <li>Attending to attending conversation has occurred</li> <li>Attestation done</li> <li>Floor/unt aware</li> <li>Labs reviewed</li> <li>Blood products needs reviewed</li> <li>Necessary inventory in room</li> <li>Potential inventory in CR</li> <li>Monitors, u/s, and tray in suitable location</li> <li>Pink cart, Pyxis, emergency airway equipment, and code cart ready</li> <li>Review how to call COVID Code</li> <li>Pre/intra meds pulled and ready</li> <li>Review air handling times (15 minutes after any potential aerosolization, 3 minutes before opening a door)</li> <li>Clean scrubs for all have been obtained</li> <li>Phor imaging reviewed and up on PACS in room as needed (no going through control room door to review images)</li> <li>Phor imaging reviewed and up on PACS in room as needed (no going through control room door to review images)</li> <li>Huddle team and confirm everything is ready before patient transports to IR</li> <li>Load team through "Pre-flight checklist" before RN leaves for transport</li> <li>Release in-room RN to travel to floor</li> <li>Call unit and inform them we are ready and in-room RN is on their way</li> <li>Make plan with floor who will wipe down door handles, elevator buttons, etc. as team advances to IR</li> </ul> <p><b>COVID lead RN:</b></p> <ul style="list-style-type: none"> <li>Assist in-room RN with gathering supplies</li> <li>Ensure isolation signs are posted</li> <li>Huddle team and confirm everything is ready before patient transports to IR</li> <li>Load team through "Pre-flight checklist" before RN leaves for transport</li> <li>Release in-room RN to travel to floor</li> <li>Call unit and inform them we are ready and in-room RN is on their way</li> <li>Make plan with floor who will wipe down door handles, elevator buttons, etc. as team advances to IR</li> </ul> <p><b>In Room primary operator</b></p> <ul style="list-style-type: none"> <li>Put on lead prior to final huddle</li> <li>Have scrubs ready</li> </ul> <p><b>Phase of Care: Transport to IR</b></p> <p><b>Primary operator:</b></p> <ul style="list-style-type: none"> <li>Don PPE per protocol in CR before patient arrives</li> <li>Assist with moving and positioning if necessary</li> <li>Sterile gown and sterile outer glove</li> </ul> <p><b>In-room tech</b></p> <ul style="list-style-type: none"> <li>Assist with moving and positioning</li> <li>Sterile gown and glove</li> </ul> <p><b>In Room RN:</b></p> <ul style="list-style-type: none"> <li>Call IR to inform staff that you are leaving</li> <li>Transports patient from floor to procedure room in lead and full PPE-gown, double mask, eye protection</li> </ul> <p><b>COVID Lead RN:</b></p> <ul style="list-style-type: none"> <li>Don hat, mask, and goggles</li> <li>Refer to transport of COVID patient policy <a href="#">LVA Health COVID-19 Resources Page</a></li> <li>Ensure consent was tubed or that you have a copy</li> <li>Does not travel with patient (not in full PPE)</li> <li>Join CR tech and lead TECH in the CR</li> </ul> <p>Begin donning process with the lead tech with those working in the procedure room. Buddy for in-room tech, scrub tech and primary operator</p>	<p><b>Phase of Care: Intra-Procedure</b></p> <p><b>Primary operator:</b></p> <ul style="list-style-type: none"> <li>Lead time out</li> <li>Prep and drape patient</li> </ul> <p><b>In room tech:</b></p> <ul style="list-style-type: none"> <li>Assist with time out</li> </ul> <p><b>Control room tech:</b></p> <ul style="list-style-type: none"> <li>Intercom activated or in-room phone speaker to control room phone</li> <li>Hands in inventory</li> <li>Ensures CR doors all stay closed</li> <li>Does not leave CR for duration of patient time in IR</li> <li>May ask lead tech to get additional inventory from second floor (leave your mask and goggles on)</li> <li>Share 3 minute timer monitoring of door opening/closing with lead RN</li> </ul> <p><b>In room RN:</b></p> <ul style="list-style-type: none"> <li>Assist with moving patient to table</li> <li>Support time out</li> <li>Hook up central and saline</li> <li>Assist by opening inventory</li> <li>Provide sedation and monitoring for the acute care patient</li> </ul> <p><b>BUc RN:</b></p> <ul style="list-style-type: none"> <li>Replenish meds or supplies for the in-room RN</li> <li>Stays in control room during procedure</li> </ul> <p><b>COVID Lead RN</b></p> <ul style="list-style-type: none"> <li>In control room with Lead tech</li> <li>Assures bed stays in room</li> <li>Assure hallway door marked so it remains closed</li> <li>Starts door timer for 3 minutes if intubation (all staff to leave room except anesthesia)</li> <li>Watch general flow of procedure and anticipate team needs</li> <li>Starts door timer for 3 minutes if extubation (all staff to leave room except anesthesia)</li> <li>May have to hand additional meds into room from pink cart or Pyxis</li> <li>Share 3 minute timer monitoring of door opening/closing during donning and duffing with lead Tech</li> </ul> <p><b>COVID lead TECH</b></p> <ul style="list-style-type: none"> <li>Assist with time out</li> <li>Assist CR tech by calling for or getting additional supplies from second floor (leave masks and goggles on if leaving CR to get additional inventory)</li> <li>Watch general flow of procedure and anticipate team needs</li> <li>Ensures control room doors stay closed unless inventory needed that is not in control room (leave the mask and goggles on)</li> </ul>	<p><b>Phase of Care: Post Procedure</b></p> <p><b>In-room RN</b></p> <ul style="list-style-type: none"> <li>Assist with moving patient back to bed with in room tech, unit RN, primary operator</li> <li>Follow strict doffing procedure <a href="#">LVA Health COVID-19 Resources Page</a> observed by Lead RN</li> <li>IR RN to doff/leave room first followed by ICU RN</li> <li>Don clean PPE for transport back to unit</li> <li>Assist with transport back to unit</li> </ul> <p><b>In room tech:</b></p> <ul style="list-style-type: none"> <li>Assist with moving patient back to bed with in room RN, unit RN, and primary operator</li> <li>Possibly help with transfer back to floor (since this person has already been exposed)</li> <li>Otherwise stays in room to start removing plastic covering</li> </ul> <p><b>Primary operator:</b></p> <ul style="list-style-type: none"> <li>Assist with moving patient back to bed with in-room tech, unit RN, primary operator</li> <li>Begin removing plastic wrapping (since you are "dirty") if tech is used for transport back to unit</li> </ul> <p><b>COVID Lead RN:</b></p> <ul style="list-style-type: none"> <li>Once patient is in bed confirm ready for transport</li> <li>Confirm in-room RN has doffed and donned for return trip to unit</li> <li>Confirm unit RN has doffed and donned for return trip to unit</li> <li>Confirm Respiratory Therapist (if present) has doffed and donned for return trip to unit</li> <li>Make unit aware patient is returning</li> <li>Gives permission to open doors</li> <li>Ensure that a team member will follow to clean surfaces touched during transport (prepare bag with bleach wipes for this team member)</li> <li>Ensure in-room RN has elevator key</li> <li>Instruct in shower/scrub change process</li> <li>Assist with cleaning of lead aprons</li> <li>Facilitate doffing procedure <a href="#">LVA Health COVID-19 Resources Page</a> with rest of staff when ready to do so</li> <li>Post "No Entrance" sign on bathroom door until after housekeeping has cleaned</li> <li>Call housekeeping for a regular clean of the shower once everyone is finished</li> <li>Tube consent back to IP nursing unit or if a copy of the consent is used, place it in the red lined trashcan</li> </ul> <p><b>In-room RN</b></p> <ul style="list-style-type: none"> <li>Follow strict doffing procedure before leaving ICU unit using the IR donning/doffing checklist <a href="#">LVA Health COVID-19 Resources Page</a></li> <li>Shower if scrubs and/or skin wets soaked during procedure; shower in IR, see "Scrub Change Process"</li> <li>Return pink cart and other supplies</li> </ul>

# COVID and IR Effects:

- Patient care
- Maintain clinical service to all patients
- Triage
- Delays
- Triage and care of comorbid conditions with COVID
  - Portal hypertension
  - Dialysis work
  - Tube patients
  - Cancer patients



[J Vasc Interv Radiol](#), 2020 Jul; 31(7): 1192–1194.

Published online 2020 May 3. doi: [10.1016/j.jvir.2020.04.030](https://doi.org/10.1016/j.jvir.2020.04.030)

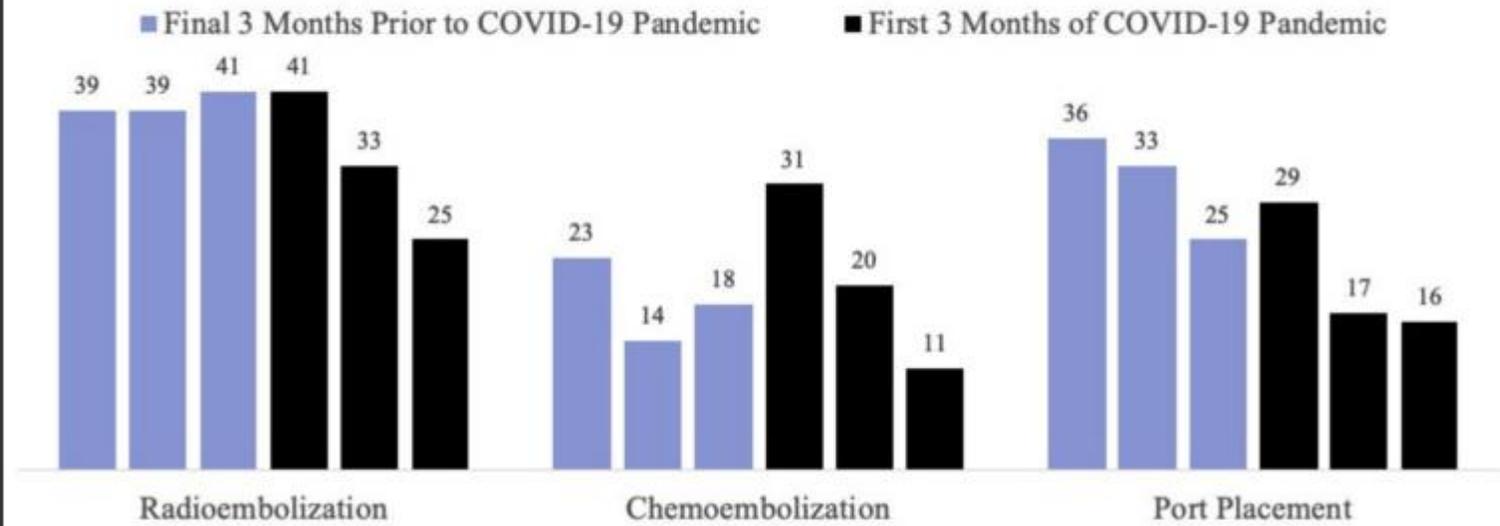
PMCID: PMC7196407

PMID: [32513549](https://pubmed.ncbi.nlm.nih.gov/32513549/)

## Leveraging IR's Adaptability During COVID-19: A Multicenter Single Urban Health System Experience

[Sayan Manna](#), BS, [Nicholas Voutsinas](#), MD, [Samuel Z. Maron](#), MA, [Mario A. Cedillo](#), MD, [Danielle Toussie](#), MD, [E. Scott Nowakowski](#), MD, [Robert A. Lookstein](#), MD, and [Aaron Fischman](#), MD

### Interventional Oncology Caseload by Month



# COVID and Clinical IR:

- Initial concerns of tremendous vasculopathies and massive need for lines, tubes, and drains

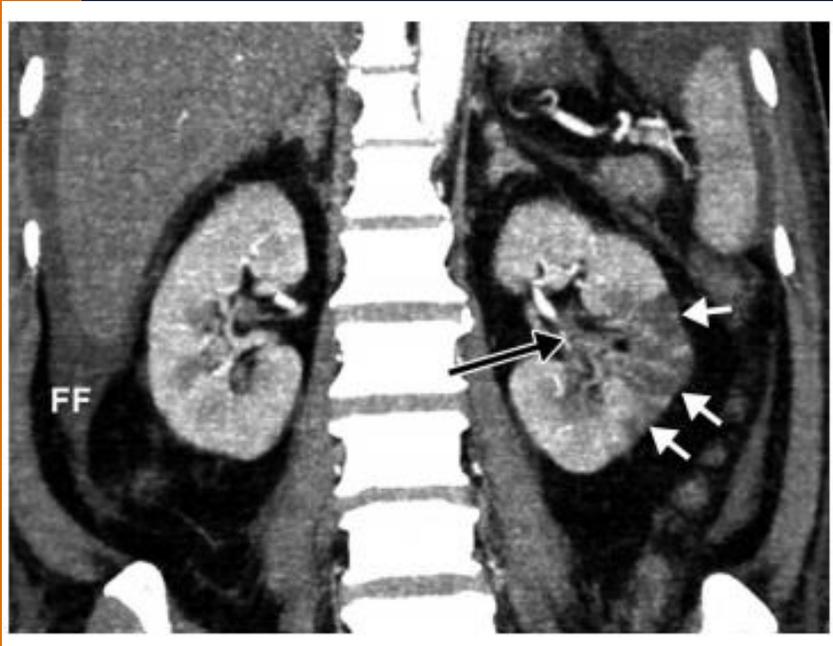
## Multisystem Imaging Manifestations of COVID-19, Part 2: From Cardiac Complications to Pediatric Manifestations

Margarita V. Revzin, MD  
Sarah Raza, MD  
Neil C. Srivastava, MD  
Robin Warshavsky, MD  
Catherine D'Agostino, MD  
Ajay Malhotra, MD  
Anna S. Bader, MD  
Ritesh D. Patel, MD  
Kan Chen, MD  
Christopher Kyriakos, MD  
John S. Pellerito, MD

**Abbreviations:** ACE2 = angiotensin-converting enzyme 2, ADC = apparent diffusion coefficient, COVID-19 = coronavirus disease 2019, FLAIR = fluid-attenuated inversion-recovery, PMIS = pediatric multisystem inflammatory syndrome, SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2

RadioGraphics 2020; 40:1866-1892  
<https://doi.org/10.1148/rg.2020200195>

Infection with severe acute respiratory syndrome coronavirus 2 results in coronavirus disease 2019 (COVID-19), which was declared an official pandemic by the World Health Organization on March 11, 2020. COVID-19 has been reported in most countries, and as of August 15, 2020, there have been over 21 million cases of COVID-19 reported worldwide, with over 800,000 COVID-19-associated deaths. Although COVID-19 predominantly affects the respiratory system, it has become apparent that many other organ systems can also be involved. Imaging plays an essential role in the diagnosis of all manifestations of the disease and its related complications, and proper utilization and interpretation of imaging examinations is crucial. A comprehensive understanding of the diagnostic imaging hallmarks, imaging features, multisystem involvement, and evolution of imaging findings is essential for effective patient management and treatment. In part 1 of this article, the authors described the viral pathogenesis, diagnostic imaging hallmarks, and manifestations of the pulmonary and peripheral and central vascular systems of COVID-19. In part 2 of this article, the authors focus on the key imaging features of the varied pathologic manifestations of



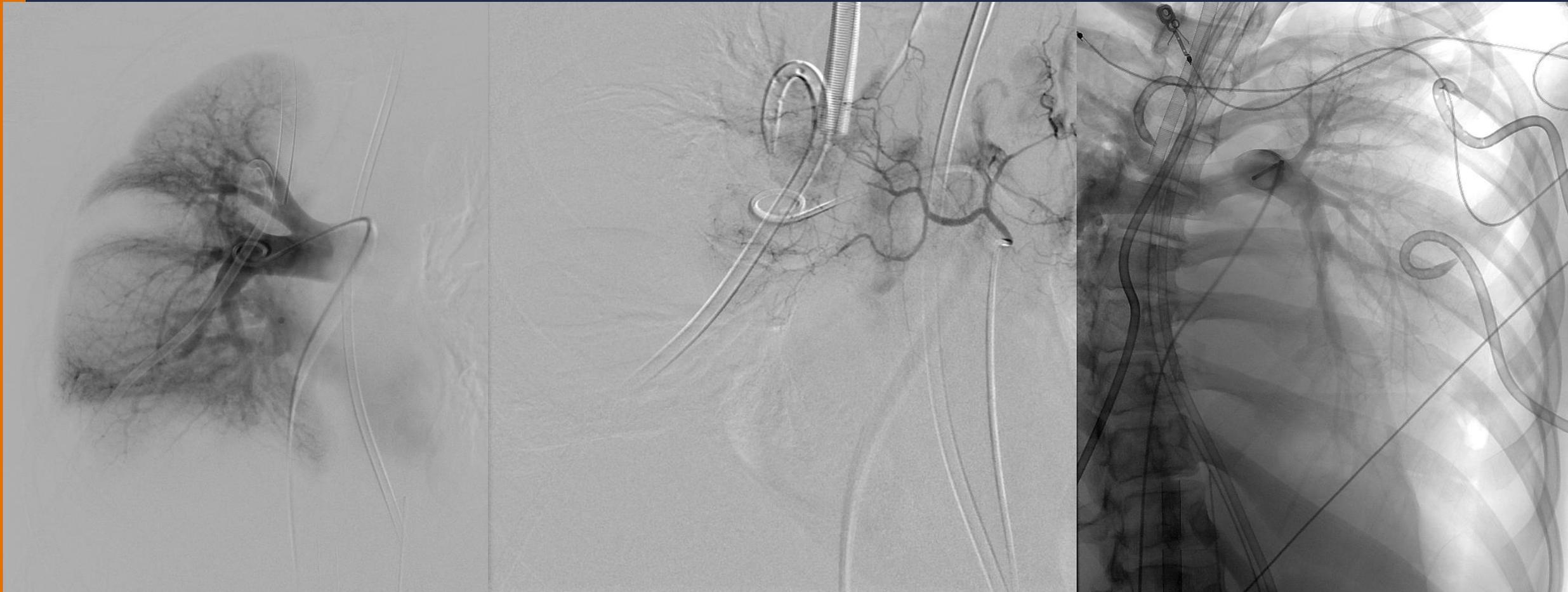
# COVID and Clinical IR:

- Initial concerns of tremendous vasculopathies and massive need for lines, tubes, and drains
- Evolved into acceptance of standard IR ICU care: hemorrhage, dialysis, infection, and enteral access.
- Occasional more aggressive interventions and complex interventions provoked and/or hampered by COVID



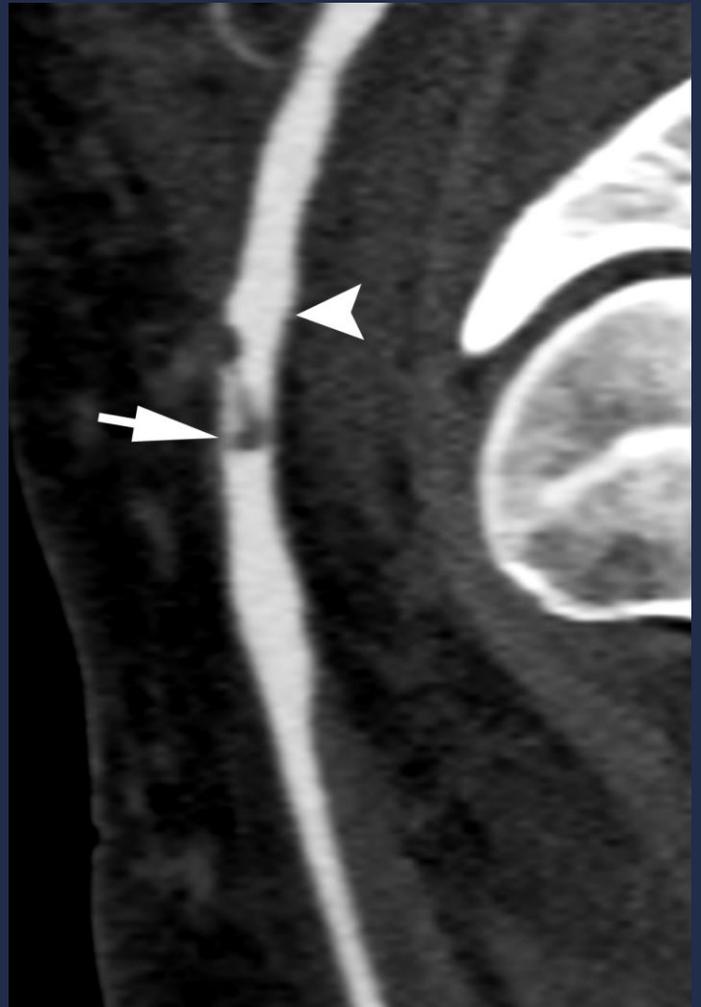
# COVID and Clinical IR:

- Young male with severe COVID pneumonia.



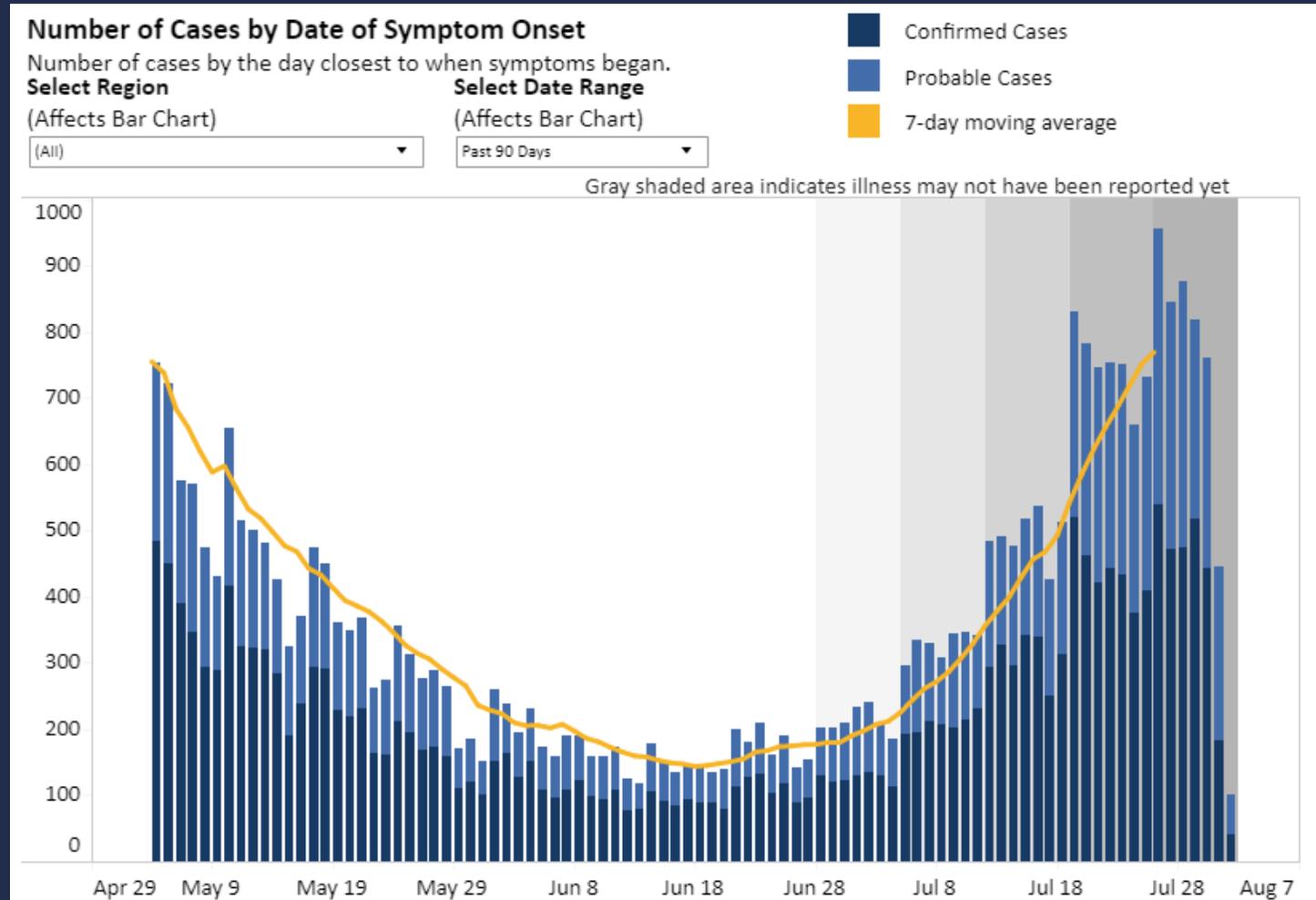
# COVID and Clinical IR:

- Spontaneous retroperitoneal bleed



# COVID and Clinical IR:

- Resilience



THANK YOU

